REMARKS

I. Introduction

Currently, claims 1-21 and 26-27 are pending. Claims 1 (article), 18 (method), 21 (article), and 26 (method) are the independent claims.

II. The Rejections

The Examiner rejected claims 1, 2, 5-13, and 18-20 as allegedly obvious under 35 U.S.C. §103(a) based upon U.S. Published Application No. 2003/0118237 to Laird (now U.S. Patent No. 7,154,531 to Laird) in view of USPN 6,737,970 to Wuestefeld and further in view of U.S. Patent No. 5,508,511 to Zur et al (Zur).

The Examiner rejected claim 10 under 35 U.S.C. §103(a) as allegedly obvious based upon Laird, Wuestefeld, and Zur and further in view of U.S. Patent No. 6,841,780 to Cofer.

III. The Advantage And Problem Solved By Applicants' Method And Device That Only Sees A Change In A Grey Level On A Sensor That Monitors A Projected Line Of Light.

Movable barrier operators that serve to control movement of movable barriers (including but not limited to garage doors of all types, gates, and shutters) have been well known and understood in the art. It is known to use infrared detectors installed at the sides of the barrier opening and aligned across a barrier opening area to detect intrusion into the area. One of the detectors, an IR source, sends an IR beam to a receiver or IR sensor aligned with the IR source located across the barrier opening. Upon sensing the absence of the IR at the sensor indicating an obstacle, movement of the movable barrier can be altered. However, the function of the IR detectors is limited to detecting an interruption of the IR beam, and the detectors need precise alignment, which provide certain difficulties during their installation.

There is a need for a simple, inexpensive detection device which is fast acting, precise in what it "sees," to wit: a change in a grey area by a single camera along a single line. Reference to memory with respect to a two dimensional "frame" is not required. Moreover, the detection device is easy to install and is able to sense intrusions and obstacles along the line as well as to

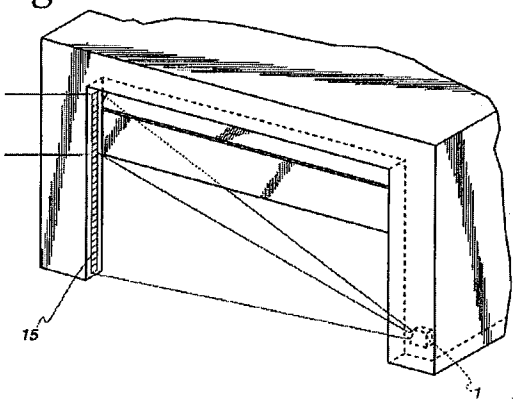
provide detection of an obstruction without necessarily referring to a memory in the operator.

IV. The References

A. Laird - Laird Uses An Image Glued To The Side Of A Barrier Opening And Effects An Imaged Based Upon An Analysis Of That Two Dimensional Image

Laird describes a pattern which is on the side of a garage door. Laird uses a digital imaging device such as a CCD camera to view the pattern on the side wall. When an object enters the field of view, it interrupts the viewing of and obscures the recognizable pattern. The digital image device detects when this situation occurs and an alarm can be initiated. Laird, paragraph 11.

Fig. 2



Laird does not -

- describe a projection device that can project a line of light on a garage floor (Laird uses a bar code image on the side of the door opening);

- control a system and effect an action based upon a change in grey level without reference to a two dimensional area (which would have to be in a memory), but rather Laird has to use a memory to detect whether there has been a change in the image of a two dimensional area on the side of the door being observed by the camera;

- have a beam projector;

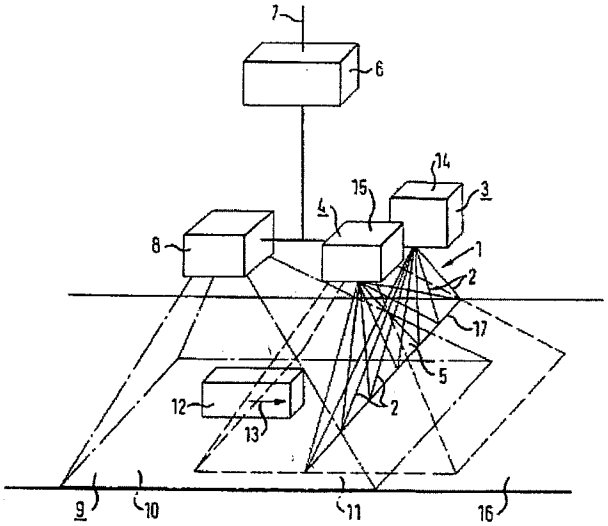
- project light line (or any projected image) on a floor or have any light on a floor as part of a detection system (gluing an image to a garage floor for Laird's CCD camera to observe would not be practical); and

- project a beam from above and at an angle offset from the projected line of light and the barrier opening.

Wuestefeld – Wuestefeld Always Relies On Multiple Cameras (Or Equivalents) To Monitor Areas As Well As A Line(s) And Does Not Monitor A Change In A Grey Level To Effect An Action Without Resort To Imaging A Two Dimensional Area.

Wuestefeld describes a system that monitors a moving conveyor belt 16 by monitoring an area of the moving belt across which a line is projected. As seen in Figure 2 reproduced below, **multiple image detectors 4 (also labeled 15) and 8 monitor two secondary areas** 10 and 11 to determine if package 12 is permitted by an analysis by evaluation unit 6. See Wuestefeld at column 4, lines 55 to 67. If it is a permitted object, then the protection device 1 is deactivated. See Wuestefeld at column 5, lines 1-8. To increase the accuracy of the device, the package 12 again can be observed in area 5 with rays 2, which project a line from transmitter unit 3/illumination unit 14 mounted above and projecting a beam to the moving belt 16. See Wuestefeld at column 4, lines 36-39 and column 5, lines 9-20.

FIG. 2



This line detection is described as follows: "The evaluation unit 6 compares the detected image of the line 17 with a pre-set reference image which corresponds to the profile of the line 17 with an object 12 not present." Wuestefeld at column 4, lines 40-44 and lines 65 et seq. Wuestefeld's comparison and action as a result thereof is not responsive to a change in grey level by a detector, but rather to an image comparison based on an image stored in a memory.

Wuestefeld never says what he does with the recognition of the object observed with the line of rays 2. He only says this analysis is done to increase the accuracy of the device or to simply detect package presence. He never says if the conveyor is stopped or if an alarm sounds or the package is diverted.

Reference to Wuestefeld's figures 1, 3, 4 and 5 does not help the rejection or support a conclusion of obviousness. Figure 1 has multiple image detectors. It has image detector unit 8 as well as a receiver unit 4 which similar to a camera in that is receives a light beam from light transmitter 3.

Figure 3 depicts putting image detectors 4 and 8 (of Figure 2) together as a part of 18. Image detector unit 18 detects two lines 17 and 19 in a two-dimensional area projected onto the conveyor belt 16. Wuestefeld at column 5, lines 21-36. By evaluating two lines, unit 18 is functioning as two image detectors. It is these lines which are evaluated by image detector 18:

> If the object enters into the secondary monitoring area 10 such that the line 19 comes to lie at the front side of the object 12, then the line 19 is displaced upwardly on the 40 object 12 in accordance with the movement of the object 12. The resulting displacement is a measure for the object height. Furthermore, the length of the object 12 can be determined by an evaluation of the object speed or the use of further light lines projected onto the conveyor belt 16. For 45 this purpose, the respective light lines 19 are detected by the image detection unit 18 and appropriately evaluated by the evaluation unit 6.

Wuestefeld at column 5, lines 37-48. Such complex analysis cannot contemplate triggering an action in response to merely sensing grey level change.

Figure 4 depicts a system monitoring multiple two dimensional areas including protection area 5 as well as secondary areas 10 and 11 by comparison to a stored image instead of in response to grey level change. Wuestefeld at column 5, lines 53-57 and 60-63.

Figure 5 merely adds the concept that the images detected by the detection unit can be displayed on a remote display unit 21 for further analysis. See Wuestefeld at column 6, lines 10-16, 20-23, and 27-36.

As can be seen from the above discussion and figure, Wuestefeld differs from the claims because:

- Wuestefeld does not stop movement of anything, but the image analysis describes turning the image detection device "off" and "on";

- applicants' device stops a movement of a barrier and the detection device is always on during the critical movement of closing the barrier so an obstruction can be detected;

- Wuestefeld does not effect an action based upon the change of a pixel or grey level, but

rather relies at least on an image of a two dimensional area and compares that image with data stored in memory to make its analysis;

- Wuestefeld relies upon a two step analysis that includes the observation of an area (e.g. 10) as well as a line with Wuestefeld not suggesting that the enhanced analysis of an image of the line stops anything, including the conveyor; and

- Wuestefeld does a topographical analysis of the package and stops and starts one detection unit with a first detection unit and only suggests line analysis based on what is stored in the memory of the system instead of reacting to a change in grey level.

Zur – Cited To Describe Stopping Or Reversing A Door With Detection Of An Object (See Page 8 Of The Office Action), But Does Not Describe Effecting A Stopping Or Reversing A Door With The Detection Of A Grey Level With A Single Camera.

Cofer

The Examiner cited Cofer in rejecting claim 10 because Cofer describes the use of a laser diode. Cofer does not add to the Laird/Wuestefeld/Zur combination because Cofer does not describe detection of the interruption of a line of light projected onto a floor of a barrier at the barrier opening. Cofer relies on imaging areas and not on the detection of a change in grey level.

Cofer describes a system that detects the presence of objects in a monitored area as opposed to a line. One or more complex patterns of light are projected onto the monitored area. Changes in the complex patterns are detected in the monitored area and these changes indicate the presence of an object in the monitored area. See Cofer, Abstract.

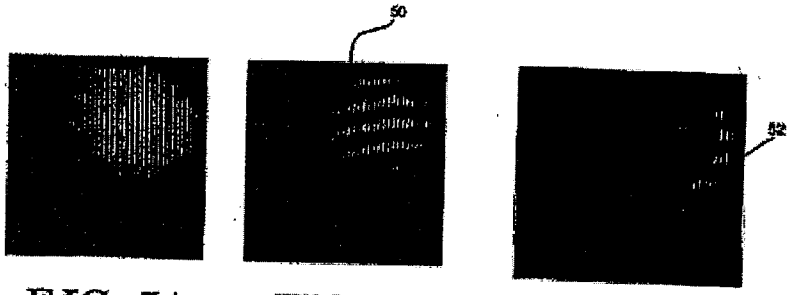


FIG. 5A FIG. 5B FIG. 5C

More specifically, Cofer teaches that a moiré interference pattern is projected onto the monitored area. The moiré interference pattern may be created in several ways. For example, two complex patterns of light may be projected onto the same area. Additionally, one pattern may be projected onto the monitored area while another may be imposed by a pattern grating positioned in the image plane of an image capture device. Further, two images of the same pattern in the same area may be captured and rotated. See Cofer at column 2, lines 1-39 and Cofer's FIGs. 5a-c reproduced below for the convenience of the Examiner. Cofer then compares the "live" image to a reference image in memory to determine whether an object exists. See FIG. 9 of Cofer.

V. No Reference Alone Or In Combination Renders The Claims Obvious

The determination of whether a grey level representative of a line of light has changed without a comparison with data stored in memory produces (as described in the claims) several advantages for the applicants' system. For example, removing the requirement to image an area and to access a data structure in memory makes the applicants' system faster than approaches where a data structure is consulted since time is not needed to access the data structure. Further, the applicants' approaches merely rely on the detection of a change in grey level reduce costs because a memory storage device to store reference patterns is not needed. The applicants' approaches also reduce set-up and maintenance costs.

Moreover, monitoring whether there is a change of grey level to detect an obstruction by the obstruction's interruption of a line of projected light (as required by all of the claims) is fast and precise. As stated at page 6, lines 21 et seq of the specification as filed:

> A sudden change of the grey level in a single point corresponds either to a point on the edge of an object or to any color or aspect variation of the acquired image. Detection of this change allows a precision measurement, due to the high resolution on the linear sensor, which is considerably better than the resolution of an area sensors. [*sic*] For instance, by using a backlight, the position of a strip can be easily detected.

As can be seen from the references, no reference alone or in combination suggests:

- the projection of a line on a floor with a projection device, which line is then observed for the detection of a change in grey level with a single camera;

- the imaging of a line to detect a change in grey level without reference to a two dimensional area or reference to data in a stored memory;

- the use of a projected line on a stationary floor to determine the interruption in the image of the line to stop a moving barrier; and

- the continuous projection of a light of line during movement of the system without shutting the detection system down.

VI. The Claims Are Supported By The Specification

The Examiner rejected claims 21 and 26-27 under 35 U.S.C. 112 for allegedly being in contradiction with the specification. These rejections are traversed. The claims are amended to recite detection of a change in grey level without reference to an image of a two dimensional area. Among other places, this amendment is supported at page 6, lines 2 – 29 of the specification as filed (see quote above for a pertinent portion of the specification).

VII. The References Should Not Be Combined, And Even If Combined Do Not Add Up To The Claims

All of the references rely on a reference to an image in memory to trigger an action and all of the references rely on a detection system that monitors an area as opposed to a line of light. Monitoring a light of line and a change in grey level is faster and cheaper than monitoring areas and comparing the monitored area with data stored in a memory. Wuestefeld's system monitors a moving conveyor belt (not a stationary floor) with multiple cameras and describes the projection of a line only in conjunction with monitoring an area. There is no practical motivation to combine Wuestefeld's projection system with Laird's camera monitoring non-projected image on the side of a door (not a floor as it would not be practical to apply an image to a floor and subject it to wear and tear) to detect an obstruction that interrupts the non-projected image to stop a moving door. Wuestefeld does not stop movement but shuts a monitoring system off, so it really teaches away from what applicants claim, and indeed, Wuestefeld teaches away from combing it with Laird, which does stop a door. Indeed, even if the references are combined they do not suggest the monitoring a change in grey level with a single camera.

There must have be a reason to combine or modify Laird with Wuestefeld to render applicant's claims obvious. There has been no meaningful articulated reason why applicant or a person of ordinary skill would have thought he had a prospect of success to monitor a projected line as described in the claims. *Ex parte Whalen*, 89 U.S.P.Q.2d 1078 (BPAI 2008); *Ex parte Alexander*, 86 U.S.P.Q. 2d 1120, 1123 (BPAI 2007). The Board in *Whalen* stated:

> The U.S. Supreme Court recently held that rigid and mandatory application of the "teaching-suggestion-motivation," or TSM, test is incompatible with its precedents. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 [82 USPQ2d 1385] (2007). The Court did not, however, discard the TSM test completely; it noted that its precedents show that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.*
>
> The Court held that the TSM test must be applied flexibly, and take into account a number of factors "in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1740-41. Despite this flexibility, however, the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the way the claimed new invention does." *Id.* "To facilitate review, this analysis should be made explicit." *Id.*
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> The KSR Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have has some "apparent reason to combine the known elements in the fashion claimed." *Id.* at 1741.
>
> **In the same way, when the prior art teaches away from the claimed solution as presented here (FF12, FF20, FF22 and FF 24), obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition.**

(Emphasis added.)

VIII. Conclusion

Based upon the foregoing amendments and remarks, it is submitted that the pending claims and application are in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 06-1135.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

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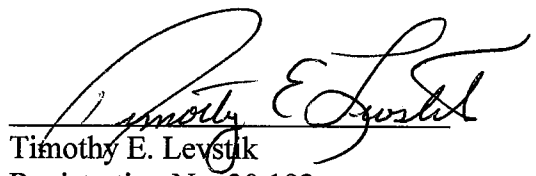

Timothy E. Levstik
Registration No. 30,192

120 South LaSalle Street, Suite 1600
Chicago, Illinois 60603-3406
Telephone (312) 577-7000
Facsimile (312) 577-7007
572854